



Notes from Panel Discussions

Climate Panel 2

- **Ms. Susan Asam**, Senior Associate, ICF International
- **Dr. Robert Corell**, Program Director, The H. John Heinz III Center for Science, Economics & the Environment
- **Mr. Joseph Hoffman**, Executive Director, Interstate Commission on the Potomac River Basin
- **Mr. Shaun McGrath**, Program Manager, Western Governors' Association
- (Moderator) **Dr. Chet Koblinsky**, Goal Team Lead, NOAA Climate Goal
- (Moderator) **Ms. Eileen Shea**, Director, NOAA Integrated Data & Environmental Applications (IDEA) Center

Extreme Weather Panel 7

- **Mr. Mark Andrews**, Lead, Weather Working Group for Joint Planning & Development
- **Dr. David Jorgensen**, Division Chief, Warnings Research & Development Division, National Severe Storms Laboratory
- **Dr. Frank Marks**, Director, Hurricane Research Division, Atlantic Oceanographic & Meteorological Laboratory
- **Mr. Lynn Maximuk**, Director, Central Regional Headquarters, NOAA National Weather Service
- **Dr. James Meagher**, Program Manager, NOAA Air Quality Program
- (Moderator) **Dr. Alexander MacDonald**, Director, NOAA Earth System Research Laboratory
- (Moderator) **Dr. George Smith**, Goal Team Lead, NOAA Weather & Water Goal

Hazard Resilience Panel 11

- **Mr. Eric Autor**, Vice President, National Retail Federation
- **Mr. Paul Bea** (PHB Public Affairs)
- **Mr. Andrew Sachs**, Director of Planning & Mitigation, James Lee Witt Associates
- **Mr. Tom Skinner**, Vice Chair, Hydrographic Services Review Panel (HSRP)
- **Dr. Gavin Smith**, Governor's Advisor, Mississippi Alternative Housing Program
- (Moderator) **CAPT Steven Barnum**, Goal Team Lead, NOAA Commerce & Transportation Goal
- (Moderator) **Dr. Margaret Davidson**, Director, NOAA Coastal Services Center

Ecosystem Panel 13

- **Ms. Kacky Andrews**, Executive Director, Coastal States Organization
- **Mr. George Lapointe**, Commissioner, Maine Department of Marine Resources
- **Ms. Stephanie Madsen**, Chair, North Pacific Fishery Management Council
- **Mr. Robert Tudor**, Deputy Executive Director, Delaware River Basin Commission
- (Moderator) **Mr. David Kennedy**, Director, NOAA Office of Ocean and Coastal Resource Management
- (Moderator) **Dr. Steve Murawski**, Goal Team Lead, Ecosystem Goal Team

Climate Panel

Margarita Gregg

- Program Structure
 - Observations & Analysis
 - Forcing
 - “Pre & Pro”
 - Decision Support
- Products and Services
 - Examples
 - Drought monitor
 - Carbon tracker
 - Assessments
 - IPCC
 - CCSP
 - US National Assessment
 - Monthly, seasonal, annual reports
- Developing Areas
 - Observations & modeling
 - Research
 - Service delivery
- Three questions for panelists
 - What are the most significant emerging societal demands for climate information services, and what is NOAA’s distinct role in responding to those demands?
 - How do you view the collaborative and supporting role of NOAA with state and regional entities?
 - How should NOAA assess impact/value of climate monitoring and prediction services it provides?

Eileen Shea

- Help us understand the scope of “climate” and NOAA’s role
- Let’s be creative!

Susan Asam

- Will focus on “adaptation” rather than “mitigation”
 - The impact of climate on our communities
 - NOAA’s role on helping us adapt

- Different ways to think of adaptation
 - Planned
 - The ideal
 - Reactive
 - Probably more costly
- NOAA's role
 - An information provider
 - An effective communicator
 - RISA has been very successful
 - Positive, rather than negative, information
 - What we CAN do
 - What information should NOAA provide?
 - A leader
 - Providing guidance on how to scope issue
 - Providing guidance on how to cope with issue
 - Not policy-prescriptive
 - Just think ahead
 - Regions and states will do the rest
- Comments/questions
 - Energy representative (?)
 - Inventories of non-CO₂ gases; confirming emissions for regulations
 - Overseas emissions
 - May be inundated with ideas for sequestration without a way to evaluate
 - Need NOAA information on feedback mechanisms
 - Representative from National Park Service
 - Want a list of options to prioritize themselves, not a prescription
 - Representative from Chevron
 - NOAA's role is as a "data broker" for sequestration
 - Everyone is working on it (government, industry, etc.), but nobody know what success looks like
 - Other
 - What kind of surveys, documentation does NOAA rely upon to gain understanding of societal needs?
 - Answer: RISAs
 - Creating and sustaining dialogue
 - What are the "gems" if information obtained?
 - The public is confused about climate change; NOAA needs to do a better job at communicating.

Shaun McGrath

- Approach
 - What the governors say
 - They want to move to a more proactive approach to dealing with drought
 - Active areas of Western Governors Association
 - NIDIS
 - Climate adaptation
 - New climate act
 - How to use climate information rather than just the science
 - There is a need for a national climate service
 - What the states need
 - Water for growing populations
 - Endangered species protection
 - Answers to questions
 - Q1: Emerging demands
 - Fast, flexible information provision
 - Integrated, accessible databases
 - Climate
 - Water
 - Demographic
 - Internet availability, even at the expense of better data
 - Improved predictive capability
 - In the medium to long term
 - At regional, sectoral level
 - In data formats people can use
 - Q2: Collaborative, supporting role
 - RISA is great, but other mechanisms are very weak
 - Poor collaboration with climate science, but good support from NWS
 - Q3: Impact, value of products
 - Training products should be done by professionals, not NOAA staff
 - Cost-benefit analyses needed
 - USGS model is better
 - Comments/questions
 - International role
 - NOAA's role is in international collaboration for GLOBAL climate change
 - It doesn't seem that NOAA believes that is an important role
 - Today and tomorrow

- NOAA could do a better job letting people know how important climate information is, global change information notwithstanding
 - There are socioeconomic issues that are independent of global change
 - NOAA should be in a position to say “this is important now,” rather than letting politics get in the way.
- Energy
 - How does NOAA work with the energy sector on the issue of energy security?
- Process
 - NOAA needs to link the research plan to observations plan to management plan in a SINGLE PRODUCT rather than 3 separate strands
 - How do you marry the short term to the long term data in a way that is usable?

Robert Corell

- Information service needs to be designed to feed and support decisions at the local level
 - You can’t create a solution without fully understanding the problem.
 - Collaboration is essential with...
 - Need at the federal level in the mission agencies
 - We should also involve the private sector
 - As well as the “knowledge sector” (academia)
 - This is an INTERNATIONAL issue, and partnerships should be international
 - NGOs should be involved, too.
 - And the media/education
 - This should be a NATIONAL, not a NOAA, climate service
 - USGS
 - BLM
 - NOAA should take the facilitating lead
 - Role: Increase understanding of climate system (and its effects) from interannual out.
 - Downscale planning to the local level
 - Regional scenario building
 - It is essential to focus on the “coping” (adaptation and mitigation)
- Comments/questions
 - Education is an essential element... and not just for school kids.
 - Climate goal budget request does not show that climate is a priority (10% below 2006). Information services need communications infrastructure.
 - Data management as a library vs. data management as the source of products and services
 - This will be an international economic/competitiveness issue.
 - NOAA can’t do everything, but it must be the conductor that harmonizes the climate enterprise.

- NOAA should be on guard that we don't sacrifice research on causation for research on mitigation.
- We are at a level of maturity that we need to see climate as an enterprise, and so it needs enterprise architecture.
- NOAA should look at its successes in the development of a private weather industry and apply it to the development of a private climate industry.

Extreme Weather Panel

Dr. Sandy McDonald—Opening Remarks

- Coming down the pike: Phased array radar
 - More rapid updates
 - Can get 2D winds
 - Can recreate it in a model
- Hurricanes:
 - New plane that can get down further
 - Again, can get it into a computer
 - “Escort” plane at 70,000 feet—continuously dropping sondes
- Weather research and forecast model (better model)
 - Very realistic simulation; air-ocean interaction

Dr. David Jorgenson: Improved Observational Technology

- “2025 Vision:” Dual POL radar; phased array radar; GOP-filling radar (CASA) unmanned aerial system (UAS); GPS-met and other advanced satellite sensors
- Looking for major increases in warning lead times, e.g., based on models: “war-on-forecast”
- Better characterization of uncertainty
- MMPAR (multi-mission phased array radar)
 - Presently a test bed in Norman (\$25 million)
- CASAs—short wavelength radars (X-band); ~ 30 km range (can be mounted on cell phone towers)
- Could look at small-scale features of storms
- “2025 Vision”—combine the above to perform better, faster, higher-resolution forecasts
NIDIS—National Integrated Drought Information Services
 - Ensemble forecasts; probabilistic assessments
- WRF—weather research forecast model, generated a super cell 24 hours in advance in about the right time at about the right location
 - Not cloud scale model; larger scale
 - For this year’s Greensburg, KS tornado case
 - Being run at NCEP; replacement for ETA model
- NOTE: MADIS—brings in multiple mesoscale systems.

Mr. Lynn Maximuk: Water Resources

- What does NOAA have to offer:
 - Services delivery: Water quality as well as quantity

- Water quality forecasting
- Water management—to optimize use among multiple users
- Expand drought and other water resource services
- Expand weather outreach services to water resource and drought services
- Work collaboratively with other agencies and private and local entities
 - Develop through regionalization initiative (Central region)

Ken Leonard (FAA): (for Mark Andrews): Aviation Weather

- Joint Planning and Development Office (JPDO): Five agencies working aviation issues
- “It’s about aviation; passengers” (i.e., not predominantly about the weather)
- Looking at increasing flights to 3X current capacity—must be better able to deal with weather—which is the cause of 70% of delays in US today (2X by 2016)
- Are participants in development of phased array radar
- Single authoritative source for information:
- Trajectory-based operations”
- Next Gen Air Transportation System (formerly NGATS)
- Need better coordination among meteorologists, dispatchers, etc.
- JPDO must align the resources of the multiple agencies involved (build global 4D weather info system)
- MPAR
- Ken Leonard works for (FAA’s) Technology and Development Office
- Ken Leonard soon to become head of Aviation Weather Division

Jim Meagher: Integrated Climate-Air Quality Management Resources

- AQ Program Manager (WW-Air Quality Program)
- Decisions on climate change will have major impact on air quality (strongly interrelated)
 - Maybe more of an impact than regulation measures
- NOAA already has programs for both climate change and air quality
- Strategy: Conduct regional studies (i.e., “AQ Assessments”)—California (2010); Northeast (2012)
- Eventually roll up to national level
- Need better emissions verification
 - e.g., aerosols change cloud optical qualities, could affect radiation budget

Dr. Frank Marks: Improving Tropical Cyclone Forecasts

- Intensity
- Structure
- Luck

- Precipitation
- Storm surge and inundation
- Information and tools to support emergency planning
- High performance computers; high-resolution models
 - Observations critical; complete 3D wind structure around core (most important!)
 - Design best integrated observation strategy (expend 15–20% of observations budget on determining the best design)
- Satellites not very good yet at “targeted observations;” need dropsondes, aircraft
- Satellites are very expensive: Are they worth the cost?
- UAS also has its tradeoffs among costs and benefits
- Must determine an Integrated Observation System strategy
- Targeted observations will be critical
- Need better observations of the oceans to initialize and drive the models
- High performance computing: Need 1-2 order-of-magnitude improvements to handle all the physics/forcings at higher resolution
- H4; GFS; present operational hurricane models
- Research models can be more distributed
- Data archive, access and dissemination critical: increase capacity at NESDIS/NCDC; need higher band widths
- Visualization: To facilitate forecasting
- Model systems; moving to ESMF as standard (incorporation core winds - a new model—nonhydrostatic—will be up and running this summer)
 - Global (GFS): Coupled ocean/land surface ensembles (non-spectral)
 - Regional (HWRF): Coupled ocean/waves and surface ensembles
- Balanced investments needed: need observations and observations strategies; cost/benefit
- Also weigh: e.g., run more ensembles vs. run at finer resolution?
- 10 year strategic plan has been disseminated; needs comments and revisions
- Need more targeted observations, as well as platforms (e.g., fixed observations)
- National Hurricane Research Initiative
- Upper 100M of ocean critical observations: Salinity and temperature
- Tropical storm interactions with ocean currents
- How to utilize these observations?
- Expect more regional stakeholder forums in the future

Top 5 issues (from Panel Discussion)

- Dave Jorgenson (NSSL): Assimilation of modernization
- Dr. Frank Marks (Hurricane Center)
 - Observing system strategy—best mix and use of observations

- Connecting observation and modeling systems
 - Best means of bring observations into models
 - best means of evaluation
- Visualization: How to present the info to the people who need to disseminate the info: within NOAA; to the public.
- Huge amounts of data: How to most optimally use it?
- More “brain power”: Need people in the universities, etc., to explore the problem—Network Enabled Operations (NEO)
- Ken Leonard: Multi-agency cooperation is building a 4-D aviation weather database (way of interchanging data among systems so that all users have access: “Single authoritative source”)
- Dr. Meagher: (AQ)—Integration and extension of what we’re doing in climate forecasting to what we’re doing in air quality
 - Management strategies to simultaneously improve air quality forecasts and climate forecasts (“win-win”)
- Lynn Maximuk:
 - Incorporating water quality as well as water quantity into water forecast services and outreach
 - Need to include more information, including that on ground aquifers via NIDIS (National Integrated Drought Information Services)

Hazard Resilience Panel

Andrew Sachs (Director of Planning & Mitigation, James Lee Witt Associates)

- Definition of hazard resilience is like a moving target, not yet defined
- Four phases in disaster events: mitigation, preparedness/awareness, response, and recovery. Need to do well in all phases. Failed in all phases during Katrina
- NOAA's science-based applications/tools are critical for all phases

Gavin Smith (Governor's Advisor, Mississippi Alternative Housing Program)

- Three topics in resilience: Ecosystem preservation/conservation, protection infrastructure, and social science for self-reliance
- Useful tools include benefit measurement and risk assessment.
- Emergency operation center is useful in recovery
- Recommendations include delivery of data and tools to local practitioners, working with partners to setup agenda on sustainable development

Eric Autor (Vice President, National Retailer Federation)

- Intermodal supply chain
- MTS carries 1/3 US gross domestic products
- Outlook: Impacts of trade growth, consumer growth, and climate change.
- Container freight is large and growing
- Critical infrastructure (e.g., in CA case: port, bridge, rail, and distribution centers, truck and rail at 50% each)
- Natural hazard risks to supply chains include earthquake, hurricane, volcano, tsunami, flooding, fire, and blizzard
- Impact on supply chain is short in duration from weeks to month. Retailers and shippers have flexible logistic contingency plans
- Better forecast tools and information are helpful

Paul Bea (PHB Public Affairs.)

- MTS has large cargo volume and provides redundancy for other transportation systems
- Navigation service includes shoreline change and channel obstruction surveys
- NOAA information provides complete picture of marine environment
- Short- and long-term needs (e.g., disaster, sea-level change)
- Recommendations include providing adequate fund to support usefulness in navigation services; expanding capacity and contract to reduce survey/data backlogs; providing real-time PORTS information to support tsunami and IOOS water level needs; supporting national PORTS program including MTS in IOOS regional planning

Tom Skinner (Vice Chair, Hydrographic Services Review Panel (HSRP))

- NOAA FY10 planning will strategically position NOAA for effective services
- Support NOAA's role in community hazard resilience
- Hydrographic survey, real-time observations, timely and accurate information for better decision making, near/on shore restoration (Baltimore), offshore resources information, HAB forecasts, shoreline erosion, etc. will all help build community hazard resilience
- Recommend to provide unified NOAA strategy, broader theme to intersect customers' needs, integrated programs, and more products for wider customers

Q&A

- Margaret Davidson: How to work with stakeholders to move economy forward after coastal hazards?
- Pam of New England: Largest gap is in recovery phase (lack of recovery plan including land use and city plan; lack of integration, still by own stovepipe approach; lack of prior experience; and need to build capacity for long-term recovery)
- Stakeholder from Houston: Need to define "resiliency" (e.g., what is the acceptable level of response?); NRT effort in re-opening waterways is useful
- Stakeholder from U.S. Chamber of Commerce: Use non-profit organizations for recovery; need to connect resiliency to risk reduction; need data to strengthen economy; how to improve aquaculture? learn from other nations' experience; how to deliver information to locals? Quality of data is important
 - Andrew Sachs: Deliver data in most useable format, timely and accurately, and think how the data will be utilized
- Stakeholder from SC: What are the responsibilities and how to coordinate with other agencies? Hurricane Hugo was a case in point
 - Panelist (Gavin Smith): Recovery is least understood; NRP is not operational and there is no agreement on agencies' role; NOAA's science leadership provides a unique role to lead. Recovery is driven by locals business and need support from the top
- Stakeholder from EPA: "One NOAA" is not well understood by local community. Integration, coordination, and connection to locals are important. Need to reach to locals

Ecosystem Panel

Highlights:

- Coastal managers live in the world of “now what?” → Providing the information is not enough, they need to be able to act on it
- Integrating information and making it available in a more timely manner
- Most decisions are taken at a local level: A hierarchy of scales is needed (correct scale is where the information can be used to make decisions)
- Regional collaboration: A toolbox to optimize technical and financial efforts and resources. Using existing authorities to share priorities
- “Budget is limited” is not a response. We need more

Opening remarks – Steve Murowski

- IEA – hard to do but we know how to do it.
- How, in the reauthorization process of several statutes, do we get authorities to shake hands emphasizing ecosystem approach?

Opening remarks – David Kennedy

- Coastal management visioning – shared effort
- Key findings:
 - Managing growth
 - Local governments
 - Regional approach
- CRCA (high points: liability, DOI’s role)

Stephanie Madsen

- NPFMC
- Ecosystem chapter in their plan for over the past dozen years
- Cap from the get-go
- Conservative harvest levels – strong believers in
- Pilot project to figure out what fishery ecosystem plan is (Aleutian Islands).
- Alaska: Not 1, but 3-4 separate ecosystems
- Goals: Educational tool/early warning system/adds ecosystem context to fishery management. Decisions/proactive instead of reactive
- Team (collaborative): Identifying relevant ecosystem interactions (probability of occurrence/impact/ecological and economic/starting from qualitative approach → what we don’t know: what are the needs of the fish relative to other fish? Are we truly accounting in balancing)

- Data? Single stock management assessments
- Thresholds? How do we go about in identifying them?
- How do we collaborate? Scared off by NOAA regional initiative at first. Interference with FMCs? MOU with several agencies (COE, ...)

Robert Tudor

- Delaware
- Strong in integrated water management
- Delaware River Basin Commission:
 - Management without regard to political boundaries. Powers: coordination, planning, regulation
 - Integrated water management
 - Adaptive management
 - Regional collaboration supported
 - Results-based management
- Umbrella: Hydrologic units and ecosystem under that. Watershed / system framework
- Regional collaboration: Toolbox for technical and financial assistance
- Private sector involvement (DuPont Risk Assessment Process)
- Continuum of observations: From river, to estuary to ocean.
- Conference every two years to identify the needs (technical, operational)
- Need for support to work through the conceptual model
- Visualization and analysis tools (“From satellites to town hall” concept)
- Question from audience: How are observations getting integrated?
- What are regional needs (regional managers perspective) that overlap with national framework?
- Data sharing → big issue NOAA could help with

George Lapointe

- Number of states involved in Gulf of Maine issues. Complex
- Not accepted: “Budget is limited”. Message to NOAA: We need more, let’s try to do better.
- Issue of control. As you move to more stakeholders, how do you bring them onboard?
- We know what we need to do and we need to figure out how
- Stepwise process
- Ultimately hard societal choices
- NOAA needs to stay involved in the balancing process
- Leap of faith – decisions need to be made, there are businesses behind

- Land – water interactions. How do you get local people involved in the decision making process?
- Issue of scale: Maine huge interest in managing locally. Issues with resources vary at (sub?)regional scale
- Adaptive management. Tendency in making processes slower as they get more complex

Kacky Andrews

- Coastal managers live in the world of “now what?” Must be able to act on the information – having the information is not enough
- Emerging issues: Managing growth and development
- Next (coming rapidly): Climate change → states are not prepared
- Scale: Over 80 % of land use decisions made at local level → not going to change.
- Correct scale is where the information can be used to make decisions
- Right now, all so diffuse.
- NOAA: Figure out how to make better use of information to make decisions at that scale
- Education needed to provide reasons for regulations and policy
- Services: NOAA should integrate its own programs to provide information/support in an already integrated manner. (No need to knock at different NOAA doors for the final users)
- Addition to the regional collaboration which has been appreciated: Bottom-up approach → regional specific priorities (NOAA listened)
- More resources needed
- Information revolution. Technology exists. Investments needed to get information much more quickly

Closing comments

- Steve Murawski
 - We have a lot of existing partnerships. What’s new: Increasing threats. How can we act on them?
 - Integration of information and making it available and timelier.
 - Hierarchy of scales
- George LaPointe
 - International boundaries to pay attention to.

Questions from the audience/discussion

- National Fisheries Institute:
 - International → Challenges and opportunities. New models for solving problems, maybe there are some ideas for collaboration models. Tackle problems based upon existing experience of others.

- “Washington ecosystem”
- Interagency opportunities
- EAM also requires agencies pay equal attention to the people they support
- Mr. Smith - International Institute Science and Tech
 - Biotechnological approach to discovery/development research/resources at microbial level
- North Carolina academic / NGO president (?):
 - Gulf of Mexico - good model for collaboration
 - Australia – bioregionalization. Could such a plan be useful, in particular for deep sea coral issues?
 - Kacky Andrews on Gulf of Mexico: Federal agencies and states using existing authorities to share priorities. No new bureaucracy. Indeed a good model.
- Stakeholder from Long Island (?)
 - What’s the political will? Evaluation methods that enable local valuation;
 - Public education to embolden local stakeholders and give them louder voices.
- Kacky Andrews: CZMA process. Interested in hearing ideas for services, mechanisms
- Steve Murawski: Not invested enough in socioeconomic.
- Stephanie Madsen: All processes open and transparent. Lots of opportunities for the public to make its voice heard. At the end someone is responsible to make a decision, which can be challenged.